



NEB-166-PUS.APP.txt  
SEQUENCE LISTING

<110> JACK, RICHARD E.  
GARDNER, ANDREW  
BUZBY, PHILIP R.  
DiMEO, JAMES J.  
NEW ENGLAND BIOLABS, INC.  
NEN LIFE SCIENCE PRODUCTS, INC.

<120> INCORPORATION OF MODIFIED NUCLEOTIDES BY ARCHAEOON DNA POLYMERASES AND RELATED METHODS

<130> NEB-166-PUS

<140> 10/089,027

<141> 2002-03-26

<150> PCT/US00/26900

<151> 2000-09-29

<150> 60/157,204

<151> 1999-09-30

<160> 33

<170> PatentIn Ver. 2.0

<210> 1

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 1  
caggcagagg cttataaaaaa tcctcgccaa cagctt 36

<210> 2

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 2  
ggtggcagca gccaactcag cttcct 26

<210> 3

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 3  
gattctcatg ataagctacg ccga 24

## NEB-166-PUS.APP.txt

<210> 4  
 <211> 5837  
 <212> DNA  
 <213> Thermococcus litoralis

<400> 4  
 gaattcgcga taaaatctat tttcttcctc cattttcaa tttcaaaaac gtaagcatga 60  
 gccaaacctc tcgccttcc tctgtcctc ccgctaacc ctttggaaac tctctccaaa 120  
 gcatttttgc atgaaagctc acgctcctct atgaggggtca gtatatctgc aatgagttcg 180  
 tgaagggtta ttctgtagaa caactccatg attttcgatt tggatggggg tttaaaaatt 240  
 tggcgaact ttatataat ttgaactcca gtttatatct ggtggattt atgataactgg 300  
 acactgatta cataacaaaaa gatggcaagc ctataatccg aatttttaag aaagagaacg 360  
 gggagttaa aatagaactt gaccctcatt ttcagcccta tatatatgct cttctcaaag 420  
 atgactccgc tattgaggag ataaaggcaa taaagggcga gagacatgga aaaactgtga 480  
 gagtgctcga tgcaatggaaa gtcaggaaaa aatttttggg aagggaagtt gaagtctgga 540  
 agctcatttt cgagcatccc caagacgttc cagctatgct gggcaaaata agggAACATC 600  
 cagctgtggt tgacatttac gaatatgaca tacccttgc caagcgttat ctcatagaca 660  
 agggcttgc tcccatggag ggagacgagg agcttaagct ctttcctt gatattgaaa 720  
 cgtttatca tgagggagat gaatttggaa agggcgagat aataatgatt agttatgccc 780  
 atgaagaaga ggccagagta atcacatggaa aaaaatatcga tttgcccgtat gtcgatgtt 840  
 tgtccatga aagagaaatg ataaagcgtt ttgttcaagt tgtaaagaa aaagaccccg 900  
 atgtgataat aacttacaat ggggacaatt ttgatttgcgtatctcata aaacgggcag 960  
 aaaagctggg agttcggcgtt gtcttaggaa gggacaaaga acatcccga cccaaagattc 1020  
 agaggatggg tgatagttt gctgtggaaa tcaagggttag aatccacttt gatctttcc 1080  
 cagttgtgcg aaggacgata aaccccccga cgtatacgtct tgaggcgtt tatgaagcag 1140  
 tttaggaaa aacccaaaagc aaatttaggag cagggaaat tgccgtctt tggggaaacag 1200  
 aagaagcat gaaaaaacta gcccagtact caatggaaa tgcttagggca acgtatgagc 1260  
 tcgggaagga attctccccc atgaaagctg agctggcaaa gctgtatgg 1320  
 gggacgtctc gagatcaagc accggcaacc tcgtggagtg gtatcttta aggggtggcat 1380  
 acgcgaggaa tgaacttgcgca ccgaacaaaact ctgtgagga agagtataaa cggcgcttaa 1440  
 gaacaactt cctggggagga tatgtaaaag agccagaaaa aggtttaggg gaaaatatac 1500  
 ttatggaa ttccgcagt ctgtaccctt caataatagt tactcacaac gtatccccag 1560  
 atacccttga aaaagaggcgt tgtaagaatt acgtatgttc tccgtatgtt ggtatataatgt 1620  
 tctgcaagga ctttccgggc ttatccctt ccataactcgg ggacttaatt gcaatgaggc 1680  
 aagatataaa gaagaaaatg aaatccacaa ttgacccgtatcgaaagaaa atgctcgatt 1740  
 ataggcaag ggcttataaa ttgcttgcaaa acagcatctt acccaacggg tggttaccaa 1800  
 taattggaaa tggagaaata aaattcgtga aaattggcga gtttataaaat tcttacatgg 1860  
 aaaaacagaa ggaaaacgtt aaaacagtag agaataactga agttctcgaa gtaaacaacc 1920  
 ttttgcatt ctcattcaac aaaaaatca aagaaagtga agtcaaaaaaa gtcaaagccc 1980  
 tcataagaca taagtataaa gggaaagctt atgagattca gcttagctct ggtagaaaaaa 2040  
 ttaacataac tgctggccat agtctgttta cagttagaaa tggagaaata aaggaagttt 2100  
 ctggagatgg gataaaagaa ggtgaccta ttgttagcacc aaagaaaatt aaactcaatg 2160  
 aaaaaggggt aagcataaaac attcccgagt taatctcaga tctttccgag gaagaaacag 2220  
 ccgacattgt gatgacgatt tcagccaaagg gcagaaagaa cttctttaaa ggaatgtga 2280  
 gaactttaag gtggatgttt ggagaaagaaa atagaaggat aagaacattt aatcgctatt 2340  
 tgttccatct cggaaacta ggccttatca aactactgccc ccggggatata gaaatgttactg 2400  
 actggagag ataaaagaaa tataaaacac ttacgagaa gcttgcgtt agcgttaagt 2460  
 acaacggaaa caagagagat tatttagtaa ttgttcaacga gatcaaggat ttatatactt 2520  
 acttcccaca aaaagagctc gaagaatggaa aattggaaac tctcaatggc tttagaacga 2580  
 attgtattct caaagtgcgtt gaggattttg ggaagctcctt agttactat gttatgtgagg 2640  
 gctatgcagg tgcacaaaaaa aataaaaactg gtgttatcgtt ttattccgtt aagcttatac 2700  
 atgaggaccc taatgttctt gagacatga aaaatgttc agaaaaattt tttggcaagg 2760  
 ttagagttga cagaaattgc gtaagtatataa caaagaagat ggcataactt gttatgaaat 2820  
 gcctctgtgg agcattagcc gaaaacaaga gatttcctt tttatatactc acctctcccg 2880  
 aaccggtagc gtggcattt ttagaggcgtt attttacagg cgatggagat atacatccat 2940  
 caaaaagggtt taggctctca aaaaaaagcg agctccttcgaaatcgtt gttatgttgc 3000  
 tgaactctt gggaaatattcc tctgtaaaaga taggcttgcgtt cagttgggtc tataatgtgt 3060  
 atataatgtt agacctgcaaa ttccacaaa cgtcttaggaa gaaaacaca tactactcta 3120  
 acttaattcc caaagagatc tttagggacg ttgttggaaa agagttccaa aagaacatga 3180  
 cgttcaagaa attaaagag cttgttgcgtt ctggaaaact taacaggggag aaagccaaacg 3240  
 tcttggatgtt cttcatatggatggatatttgcgttgcag agtcaaaaat gttaaagaaa 3300  
 aggactatgtt agggatgttgc tatgacctaa gcttgcgtt gtttttttttgcgttgc 3360  
 gttttgggtt gctctatgtt cacaacagctt atacggctt tatgggtt cctaaggca 3420

NEB-166-PUS.APP.txt

gatggtaactc gaaggaatgt gctgaaagcg ttaccgcattt ggggagacac tacatagaga 3480  
 tgacgataag agaaatagag gaaaagttcg gcttaaggt tctttatgcg gacagtgtct 3540  
 caggagaaag ttagatcata ataaggcaaa acggaaagat tagatttgcg aaaataaagg 3600  
 atctttctc taaggtggac tacagcattt gcgaaaaaga atatgcatt ctcgaaggtg 3660  
 ttgaagcact aactctggac gatgacggaa agcttgcgtg gaagccccgtc ccctacgtga 3720  
 tgaggcacag agcgaataaa agaatgttcc gcatctggc gaccaacagc tggtatata 3780  
 atgttactga ggttacttctt ctcataggct atctaaacac gtcaaaaacg aaaactgc 3840  
 aaaaaatccgg gaaaagacta aaggaagttaa agccttttgcg attaggcaaa gcagtaaaat 3900  
 cgctcatatg cccaaatgca ccgttaaagg atgagaatac caaaactgcg gaaatagc 3960  
 taaaattctg ggagctcgta ggattgattt taggagatgg aaactgggtt ggagatttctc 4020  
 gttggcaga gtattatctt ggacttcaa caggcaaaa tgcaagag ataaagcaaa 4080  
 aacttctgga accccttaaaa acttatggag taatctcaaa ctattacca aaaaacgaga 4140  
 aagggactt caacatcttgc gcaaagagcc ttgtaaagtt tatgaaaagg cactttaagg 4200  
 acgaaaaagg aagacgaaaa attccagaatgt tcatgtatgc gcttccgggtt acttacatag 4260  
 aggcatttctt acgaggactt tttcagctg atggactgt aactatcagg aaggaggatc 4320  
 cagagatcag gctaacaacatttgcg attatgcgtg actttcttaa ggaagtaagg aagcttctgt 4380  
 ggattgttgg aatttcaaat tcaatatttgcg ctgagactac tccaaatgcg tacaatgg 4440  
 tttctactgg aacctactca aagcatctaa ggatcaaaaa taagtggcgt tttgctgaaa 4500  
 ggataaggctt ttaatcgag agaaagcaga agagactttt agaacattt aaatcagc 4560  
 gggtaaaaag gaataccata gattttggct ttgatcttgcg catgtgaaa aaagtgc 4620  
 agataccata cgagggttac gtttatgaca ttgaagtcgag agagacgc 4680  
 caaacaacat cctgtacac aatactgcg gctttatgc cacaataccccc ggggaaaagc 4740  
 ctgaactcat taaaagaaa gccaaggat tccctaaacta cataaaactcc aaacttcc 4800  
 gtctgcttgcg gcttggat gagggtttt acttgcgatggg attctttttt acaaaaaaagc 4860  
 gctatgcgtt catatgtggaa gagggtggaa taacaacaag ggggttggaa gtagtaagga 4920  
 gagatggag ttagatgtt aaggagactt aggcaaggtt ttagaggctt atacttaaag 4980  
 agggaaagtgt taaaaggtt gtagaaagtgcg ttagagatgt ttagagatggaa atagcaaaat 5040  
 acagggttcc acttgcggat cttgttatcc atgagcagat taccaggat taaaaggact 5100  
 acaaaagccat tggccctcat gtcgcgatag caaaagact tgccgcaaga gggataaaag 5160  
 tggtaatccggg cacaataata agctatatgc ttctcaaaagg gagcggaaag ataaagcgata 5220  
 tagaaaacca agtttgcgcg gcagacttgcg ggtactcga agcgttggaa tacagaaagg 5280  
 aggatthaag gtatcaaagc tcaaaacaaa ccggcttaga tgcatggctc aagaggtagc 5340  
 tctgttgcgtt tttagtccaa gtttctccgc gagtctctt atctctctt ttttgcgtt 5400  
 tatgtggttt tcatttacta ttaagtagtc cgccaaagcc ataacgc 5460  
 cttgagctctt ttccagtc tggcccttcaaa ttcaactccat gttttggat cgtcgcttct 5520  
 ccctttctgt ctaaggctctt cgaatctttt tcttggcgaa gagtgcgttccat 5580  
 tatcttcc tctggaaacg catctttaaa cgtctgaattt tcatcttagag acctcactcc 5640  
 gtcgattata actgccttgtt acttctttag tagttctttt accttggaa tcgttaattt 5700  
 tgccacggca ttgtccccaa gtcctgcctt aagctgaatg ctcacactgt tcatacc 5760  
 gggaggcttcc gggatcc 5820  
 gggaggcttcc gggatcc 5837

<210> 5  
 <211> 15  
 <212> PRT  
 <213> Thermococcus litoralis

<400> 5  
 Ala Ile Lys Leu Leu Ala Asn Ser Tyr Tyr Gly Tyr Met Gly Tyr  
 1 5 10 15

<210> 6  
 <211> 15  
 <212> PRT  
 <213> Pyrococcus Sp. (GB-D)

<400> 6  
 Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
 1 5 10 15

<210> 7

NEB-166-PUS.APP.txt

<211> 15  
<212> PRT  
<213> Thermococcus sp.

<400> 7  
Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 8  
<211> 15  
<212> PRT  
<213> Pyrococcus furiosus

<400> 8  
Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 9  
<211> 15  
<212> PRT  
<213> Thermococcus fumicolans

<400> 9  
Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 10  
<211> 15  
<212> PRT  
<213> Thermococcus gorgonarius

<400> 10  
Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 11  
<211> 15  
<212> PRT  
<213> Thermococcus sp. (TY)

<400> 11  
Ala Val Lys Leu Leu Ala Asn Ser Tyr Tyr Gly Tyr Met Gly Tyr  
1 5 10 15

<210> 12  
<211> 15  
<212> PRT  
<213> Pyrococcus abyssi

<400> 12  
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 13  
<211> 15  
<212> PRT  
<213> Pyrococcus glycovaorans

NEB-166-PUS.APP.txt

<400> 13  
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 14  
<211> 15  
<212> PRT  
<213> Pyrococcus horikoshii

<400> 14  
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 15  
<211> 15  
<212> PRT  
<213> Pyrococcus sp. (GE23)

<400> 15  
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 16  
<211> 15  
<212> PRT  
<213> Pyrococcus Sp. (KOD1)

<400> 16  
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 17  
<211> 15  
<212> PRT  
<213> Pyrococcus woesei

<400> 17  
Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 18  
<211> 15  
<212> PRT  
<213> Archaeoglobus fulgidus

<400> 18  
Thr Leu Lys Val Leu Thr Asn Ser Phe Tyr Gly Tyr Met Gly Trp  
1 5 10 15

<210> 19  
<211> 15  
<212> PRT  
<213> Cenarchaeum symbiosum

<400> 19  
Ala Leu Lys Val Val Leu Asn Ala Ser Tyr Gly Val Met Gly Ala  
Page 5

## NEB-166-PUS.APP.txt

1

5

10

15

<210> 20  
<211> 15  
<212> PRT  
<213> Methanococcus jannaschii

<400> 20  
Ser Ile Lys Ile Leu Ala Asn Ser Val Tyr Gly Tyr Leu Ala Phe  
1 5 10 15

<210> 21  
<211> 15  
<212> PRT  
<213> Methanococcus voltae

<400> 21  
Ser Ile Lys Val Leu Ala Asn Ser His Tyr Gly Tyr Leu Ala Phe  
1 5 10 15

<210> 22  
<211> 15  
<212> PRT  
<213> Pyrodictium occultum

<400> 22  
Ala Leu Lys Val Leu Ala Asn Ala Ser Tyr Gly Tyr Met Gly Trp  
1 5 10 15

<210> 23  
<211> 15  
<212> PRT  
<213> Sulfurisphaera ohwakuensis

<400> 23  
Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala  
1 5 10 15

<210> 24  
<211> 15  
<212> PRT  
<213> Sulfolobus acidocaldarius

<400> 24  
Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala  
1 5 10 15

<210> 25  
<211> 15  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 25  
Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala  
1 5 10 15

NEB-166-PUS.APP.txt

<210> 26  
<211> 15  
<212> PRT  
<213> Herpesvirus

<400> 26  
Ala Ile Lys Val Val Cys Asn Ser Val Tyr Gly Phe Thr Gly Val  
1 5 10 15

<210> 27  
<211> 15  
<212> PRT  
<213> human herpesvirus 2

<400> 27  
Ala Ile Lys Val Val Cys Asn Ser Val Tyr Gly Phe Thr Gly Val  
1 5 10 15

<210> 28  
<211> 15  
<212> PRT  
<213> Human cytomegalovirus

<400> 28  
Ala Leu Lys Val Thr Cys Asn Ala Phe Tyr Gly Phe Thr Gly Val  
1 5 10 15

<210> 29  
<211> 15  
<212> PRT  
<213> Human DNA Polymerase alpha

<400> 29  
Ala Leu Lys Leu Thr Ala Asn Ser Met Tyr Gly Cys Leu Gly Phe  
1 5 10 15

<210> 30  
<211> 15  
<212> PRT  
<213> Phage T4

<400> 30  
Asn Arg Lys Ile Leu Ile Asn Ser Leu Tyr Gly Ala Leu Gly Asn  
1 5 10 15

<210> 31  
<211> 635  
<212> DNA  
<213> Consensus using 9 degrees N or AmpliTaq

<220>  
<221> misc\_feature  
<222> (2)..(3)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature

NEB-166-PUS.APP.txt

<222> (5)..(5)  
<223> s is g or c

<220>  
<221> misc\_feature  
<222> (11)..(12)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (14)..(14)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (18)..(18)  
<223> s is g or c

<220>  
<221> misc\_feature  
<222> (28)..(28)  
<223> s is g or c

<220>  
<221> misc\_feature  
<222> (35)..(35)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (39)..(39)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (46)..(46)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (63)..(63)  
<223> y is c or t

<220>  
<221> misc\_feature  
<222> (77)..(77)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (84)..(84)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (128)..(128)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (152)..(152)  
<223> n is a, c, g, or t

NEB-166-PUS.APP.txt

<220>  
<221> misc\_feature  
<222> (372)..(372)  
<223> y is c or t

<220>  
<221> misc\_feature  
<222> (518)..(518)  
<223> m is a or c

<220>  
<221> misc\_feature  
<222> (530)..(530)  
<223> m is a or c

<220>  
<221> misc\_feature  
<222> (544)..(544)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (565)..(565)  
<223> w is a or t

<220>  
<221> misc\_feature  
<222> (587)..(588)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (593)..(593)  
<223> w is a or t

<220>  
<221> misc\_feature  
<222> (596)..(596)  
<223> m is a or c

<220>  
<221> misc\_feature  
<222> (616)..(616)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (621)..(621)  
<223> k is g or t

<400> 31  
tnntsggaaa nncnggcsat tgccaatstt gcatkcctkc aggtcngact ctagaggatc 60  
ccygggtacc gagctcngaa ttcngtaatc atggtcatacg ctgtttcctt gtgtgaaatt 120  
gttatccngc tcacaattcc acacaacata cngagccgga agcataaaagt gtaaagcctg 180  
gggtgcctaa tgagtgagct aactcacatt aattgcgttg cgctcacttg cccgcttcc 240  
agtcgggaaa cctgtcgtgc cagctgcatt aatgaatcgg ccggagagggc ggtttgcgta 300  
ttgggcgcca gggtggttt tctttcacc agtgagacgg gcaacagctg attgcccttc 360

.. .. ..

NEB-166-PUS.APP.txt

accgcctggc	cytgagagag	ttgcagcaag	cggccacgc	tggtttgc	cagcaggcga	420
aaatatggt	gttccgaaat	cggcaaaatc	ccttataaaat	caaaagaata	gccccgagat	480
agggttgaag	tgttgttcca	gttttgaaca	agagtccmct	attaaagaam	gtggactcca	540
acgkcaaagg	gcaaaaaacc	gtctwtcagg	ggcgatggcc	actacgkkaa	ccwtcmcccta	600
atcaagttt	tggggkcgag	kggcccgttaa	gccta			635
<210>	32					
<211>	615					
<212>	DNA					
<213>	M13mp18	bacteria	phage	DNA		
<220>						
<221>	misc_feature					
<222>	(2)..(3)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(6)..(6)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(21)..(21)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(468)..(468)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(532)..(532)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(535)..(535)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(560)..(560)					
<223>	n is a, c, g, or t					
<220>						
<221>	misc_feature					
<222>	(577)..(577)					
<223>	n is a, c, g, or t					
<400>	32					
tnntcnacgg	ccattgccaa	ncttgcatgc	ctgcaggtcg	actctagagg	atccccgggt	60
accgagctcg	aattcgtaat	catggtcata	gctgtttcct	gtgtaaatt	gttatccgct	120
cacaattcca	cacaacatac	gagccggaag	cataaagtgt	aaagcctggg	gtgcctaattg	180

NEB-166-PUS.APP.txt

agttagctaa ctcacattaa ttgcgttgcg ctcactgccg gctttccagt cggaaacct	240
gtcgtgccag ctgcattaat gaatcgcccg gagaggcggt ttgcgttattg ggccgcaggg	300
tggttttct tttcaccagt gagacgggca acagctgatt gcccttcacc gcctggccct	360
gagagagttg cagcaagcgg tccacactgg tttgccccag caggcgaaaa tatggtggtt	420
ccgaaatcgg caaaatccct tataaatcaa aagaatagcc cgagatangg ttgaagtgtt	480
gttccagttt ggaacaagag tccactatta aagaaagtgg actccaacgt cnaanggcga	540
aaaaccgtct atcaggggcn atggccacta cgttaancat caccaatcaa ttttggggt	600
cagtgcctaa gccta	615

<210> 33  
<211> 602  
<212> DNA  
<213> M13mp18 bacteria phage DNA

<220>  
<221> misc\_feature  
<222> (8)..(9)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (11)..(11)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (20)..(20)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (26)..(27)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (31)..(31)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (35)..(35)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (40)..(40)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (46)..(46)  
<223> n is a, c, g, or t

NEB-166-PUS.APP.txt

```
<220>
<221> misc_feature
<222> (60)..(60)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (68)..(68)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (75)..(75)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (119)..(119)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (124)..(124)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (132)..(132)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (139)..(139)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (143)..(143)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (173)..(174)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (194)..(194)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (196)..(196)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (210)..(210)
<223> n is a, c, g, or t

<220>
<221> misc_feature
```

NEB-166-PUS.APP.txt

```
<222> (213)..(213)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (220)..(220)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (246)..(246)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (252)..(252)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (297)..(297)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (326)..(326)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (329)..(329)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (342)..(342)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (349)..(349)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (365)..(365)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (368)..(368)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (378)..(378)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (419)..(419)
<223> n is a, c, g, or t
```

## NEB-166-PUS.APP.txt

<220>  
<221> misc\_feature  
<222> (428)..(428)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (435)..(435)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (454)..(454)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (502)..(502)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (537)..(537)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (551)..(551)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (571)..(571)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (597)..(597)  
<223> n is a, c, g, or t

<400> 33  
tgggaaannc nggcgagccn atgttnnatt ncttnaggcn gctctngagg atccctgggn 60  
ccggctcnga attcngtaat catggtcata gctgttcct tgtgtgaaat tgttatccng 120  
ctcncaattc cncacaacnt acngagccgg aagctaaagt gtaaaagctgg ggnnctaatg 180  
agtgagctaa ctcncnttaa ttgcgttgcn tcncttgccn gtttccagtc gggaaactgt 240  
cgtgcngctg cnttaatgaa tcggccggag aggccgttg cgtattggc gcagggnggt 300  
ttttctttc accagtgaga cgggcnaacng tgattgcctt cnccgctgnc cttgagagag 360  
ttgcngcnag cggtcccntag gtttgcctag cagggaaaat atggtggtcc gaaatcgna 420  
aatccttna aatcnaaaga atagccccga gatngggttg agtgttgtcc agtttggAAC 480  
aagagccccct attaaagaac gnggactcca acggcaaagg gcgaaaaacc gcttcnggg 540  
cgatggccct ncggaaacct tcccctaatac nagttttgg gggcgaggggg ccgttangcc 600  
ta 602

NEB-166-PUS.APP.txt